Applicant : Carl Anderson et al.
Serial No. : 10/646,858
Filed : August 22, 2003
Page : 7 of 11

Attorney's Docket No.: 04843-043001 / MCL - 2006.0

REMARKS

Applicants appreciate the telephone interview with the Examiner on November 21, 2007 to discuss amendments based on the language proposed by the Examiner in the last Office Action. No agreement was reached.

Claims 1, 3-14, 17-25 and 27-29 are pending. As discussed during the telephone interview, applicants have amended independent claims 1, 14, 21, and 27 to require that the radiation is detected "during a scanning of the subject, wherein the system measures motion simultaneously with, and independently of, the scanning of the subject" and that the update of the slice prescription is performed "while the scanning is performed." Support for these amendments can be found, for example, at page 2, lines 14-25.

35 U.S.C. § 103

Claims 1, 2, 4, 5, 9-19, 21-23, and 25-29 have again been rejected as being allegedly unpatentable over Evans et al. (U.S. Patent No. 6,858,003) in view of Cosman (U.S. Patent No. 6,662,036). Applicants traverse this rejection for the following reasons.

Applicants argued in their Request for Continued Examination, that Cosman does not disclose "updating of the scanning protocol itself, and certainly there is no discussion of dynamically updating slice prescriptions in a magnetic resonance imaging protocol." The Examiner has disagreed, noting in the Office Action (at pages 2-3):

> Cosman discloses that initial data including scanning protocols, slice data, position coordinates and other such information is taken (Col 5 Line 24-36). Cosman then in column 11, Lines 4-35 describes the analogous use of a LINAC device substituted with those of a CT, MRI, or other such system. Finally in column 5 Line 35-54, the positions of the index markers is then used to determine slice and scanning data for the imaging system employed which would be a dynamic calculation of the index-marked positions.

As explained below, after reviewing the Cosman reference, applicants find no support for the Office's position.

First, Cosman does not disclose updating "slice prescriptions in the scanning protocol, while the scanning is performed." In fact, Colman discloses a surgical <u>positioning</u> system that is primarily described in connection with a LINAC X-ray treatment machine. Specifically, Cosman discloses that an internal target position "is determined relative to the couch F, the gantry 1, the beam B and the isocenter point 7." Based on such information, one positions the gantry 1 and the couch and controls the treatment. The positioning is further explained such that "the couch F is moved to access the desired target with the isocenter point 7" (column 6, lines 18-28 and lines 48-54).

Cosman describes how the internal target position is determined, for example, at column 4, lines 27-41, and column 5, lines 24-36. These paragraphs refer to a planning phase during which one generates and stores "planning" scan data. For example, the scan data can be acquired with a CT or MRI scanner and can comprise 2D (slice data) or 3D data of the target area. This "planning" scan data is then related to the camera coordinate systems via the markers.

In a treatment phase, the positions of the markers are determined as "reference locations" in the "planning" scan coordinate system and in the "treatment" coordinate system, when the patient is positioned on the couch F. By moving the couch F, the target is then positioned in the isocenter 7.

As disclosed in column 7, lines 6-22, the above summarized surgical positioning procedure can also be applied during treatment. For example, the position can be continually confirmed or the radiation can be synchronized with a respiratory movement.

In the examples discussed above, the position information provided by the markers is used for a) moving the patient and b) synchronizing the radiation. However, Cosman does not disclose that "slice prescriptions in a scanning protocol" can be or are updated "while the scanning is performed, to compensate for movement of the subject."

Second, the Office Action states that Cosman describes applying the surgical positioning system to diagnostic systems. Specifically, Cosman describes how to locate a patient, for example, in an interoperative MRI scanner, i.e., how "to move a target from one historic image

scan episode to the scan slice plane(s) of the interoperative image scanner" (at column 11, lines 8-11). The historic image scan episode seems to be comparable to the planning phase in the LINAC application and the scan slice plane(s) seems to refer to the treatment phase in the LINAC application.

Thus, Cosman describes how to position the patient in the interoperative scanner according to a "historic" position, which then allows comparing historic and interoperative images. However, such a surgical positioning method does not disclose or even suggest that "slice prescriptions in a scanning protocol" can be or are updated "while the scanning is performed, to compensate for movement of the subject."

Third, applicants could not find any disclosure that the index markers of Cosman are used to determine slice and scanning data for the imaging system employed. In Cosman, the markers are used to position the patient appropriately, but the markers do not affect the scanning, e.g., the slice position within the scanner.

In the Response to Arguments, the Office Action further alleges that the Cosman system "has the capacity to store multiple sets of slice prescription data" (at page 3). However, being able to store multiple sets of slice prescriptions (in the sense of scanning protocols) or multiple sets of slice data (being acquired in the planning or treatment phase) does not indicate any affect on the scanning protocol. Thus, Cosman does not suggest updating the scanning protocol while the scanning is performed as the claims now require.

The rejection of claims 1, 2, 4, 5, 9-19, 21-23, and 25-29 was also based on Evans. Evans discloses a surgical system for performing cardiac surgery. The system in Evans is designed to keep the relative position of a surgical instrument generally constant with respect to the area for surgery, even though the patient may be moving. Thus, Evans compensates for motion of the patient by mechanically adjusting the position of the surgical instrument to keep it constant with respect to the area for surgery. However, Evans does also not disclose updating "slice prescriptions in the scanning protocol, while the scanning is performed."

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Page   : 10 of 11

To summarize, applicants' independent claims cover updating the way in which magnetic resonance data is acquired, while the scanning is performed, by dynamically updating the slice prescriptions used in the protocol, wherein the system measures motion of the subject simultaneously with, and independently of, the scanning of the subject. This is very different from Evans, which is focused on physically moving a surgical instrument to maintain a constant position relative to the area for surgery, and from Cosman, which as discussed above uses markers as reference locations when aligning a patient. Neither reference, either singly or in combination, discloses the feature of updating the way in which magnetic resonance data is acquired, as the image is being acquired, by dynamically updating slice prescriptions while the scanning is performed. Consequently, none of the independent claims are unpatentable over the combination of Evans and Cosman. The dependent claims are also patentable for at least the reason that they depend from the patentable independent claims.

Several other dependent claims have also been rejected. Claims 3 and 24 have been rejected as being allegedly obvious over Evans and Cosman, and further in view of Beetz, Jr. et al. (U.S. Patent No. 6,045,677). Claims 6 and 7 have been rejected as being allegedly obvious over Evans and Cosman, and further in view of Schmitz (U.S. Patent No. 6,050,724). Claim 8 has been rejected as being allegedly obvious over Evans and Cosman, and further in view of Nakagawa et al. (U.S. Patent Application No. US2002/0122117). Claim 20 has been rejected as allegedly obvious over Evans and Cosman, and further in view of Ward et al., Mag. Res. Med. (2000). In each of these rejections, the Office admits that the combination of Evans and Cosman does not expressly describe the specific claim limitations, but then alleges that these particular limitations would have been obvious in light of the additionally cited references. Applicants submit that none of these additionally cited references disclose or even suggest dynamically updating a scanning protocol, much less dynamically updating slice prescriptions in an MRI scanning protocol during the scanning. Thus, each of these dependent claims are patentable because they depend from a patentable independent claim, for at least the reasons discussed above.
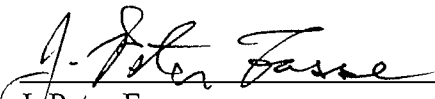
CONCLUSION

Applicants respectfully submit that all of the pending claims are in condition for allowance.

The fee for the One Month Extension of Time of $60.00 is being paid concurrently with the Electronic Filing System (EFS) by way of Deposit Account authorization. Please apply all charges or credits to Deposit Account No. 06-1050, referencing Attorney Docket No. 04843-043001.

Respectfully submitted,

Date:_____11 - 30 - 2007_____   _____

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